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NOISE IMPACT ASSESSMENT

at

**PROPOSED WASTE TRANSFER STATION,
STILLINGFLEET MINE SITE,
STILLINGFLEET,
SELBY,
NORTH YORKSHIRE.**

Dates of measurements: 6th & 23rd September 2016

Date of report: 28th December 2016

Prepared for: ASA Crushing

Consultant: MWP Planning

CONTENTS

1.0 **Summary and Conclusions**

An application is being submitted to develop a waste transfer station on the site of the former Stillingfleet Mine near Selby. The applicant has commissioned this survey of sound measurements and predictions to accompany the application. Sound predictions are based on data provided by the manufacturers of plant items to be used at the development or on typical sound levels provided for predictive purposes in BS 5228. Background sound measurements have been taken at the nearest dwellings during periods of daytime and night as part of this survey..

1.1 Sound generated by the proposed waste transfer station is predicted at the nearest dwellings at 34-41 dB LA_{eq} during the daytime. There will be no sound emission at night.

1.2 The existing background levels have been measured at these receptors at 37-42 dB LA_{90} during two daytime periods.

1.3 It is predicted from the survey that the overall sound levels caused by the proposed development will be rated at 4-6 dB above the existing background at the nearest dwelling and below the background sound levels at all other dwellings.

1.4 The main sound source affecting the nearest dwelling will be lorries on the access road to the premises, which passes at a distance of 230m. There is existing HGV traffic on the access road and there would have been HGV usage of this road when it provided access to Stillingfleet Mine. By the method of BS 4142: 2014 this should be taken into account and the the impact assessment may be modified in terms of the “context” of the dominant sound source.

1.5 With reference to the National Planning Policy Framework, sound from the development will achieve No Observed Effect Level (NOEL) at all dwellings except at the nearest dwelling where it will reach the Lowest Observable Adverse Effect Level (LOAEL).

2.0 Planning Requirements on Noise

No formal requirements have been received at this stage on the acceptance criteria of the Local Planning Authority with regard to sound levels at the proposed development. As a starting point this report refers to the planning policies described in the National Planning Policy Framework (NPPF) and the guidance of BS 4142 as summarised below.

2.1 Central Government Policies

The government's planning policies are described in the National Planning Policy Framework (NPPF) which includes consideration of potential adverse impacts of noise caused by new development. The NPPF makes reference to the Noise Policy Statement for England (NPSE) which includes an Explanatory Note describing three incremental categories of noise impact:

- No Observed Effect Level (NOEL) being the situation below which no effect caused by noise can be detected,

- Lowest Observable Adverse Effect Level (LOAEL) being the situation above which adverse effects caused by noise can be detected,

- Significant Observed Adverse Effect Level (SOAEL) being the level above which significant adverse effects caused by noise occur.

Stated objectives of the NPSE are:

1. Avoid significant adverse impacts, usually interpreted as calling for sound levels above SOAEL to be avoided.

2. Mitigate and minimise adverse impacts, usually interpreted as calling for noise mitigation to be used within the bounds of practicality for situations between LOAEL and SOAEL.

3. Where possible contribute to the improvement of health and quality of life, usually interpreted as calling for noise reductions to be made where possible for situations between NOEL and LOAEL.

Although introducing these subjective concepts for the assessment of noise impact, the NPPF and NPSE documents do not provide quantitative values against which the suitability of a site for development can be assessed in terms of sound levels.

2.2 **BS 4142: 2014**

The rating method of BS 4142 is to measure the outdoor sound levels at noise-sensitive properties during the emission of noise from the industrial or commercial premises under consideration and measure the background sound level typical of that location in the absence of the industrial sound. A correction factor is applied if appropriate to the industrial sound levels for some acoustic features which affect its acceptability, described as tonal, impulsive or other characteristic features which are distinctive against the residual acoustic environment. The corrected measured level, the rating level, is compared with the background.

- If the rating level exceeds the background by around +10 dB or more then this is an indication of a significant adverse impact, depending on the context.

- A difference of around +5 dB is an indication of an adverse impact, depending on the context.

- The lower the rating level is relative to the background, the less likely it is that the industrial source will have an adverse impact.

- Where the rating level does not exceed the background, this is an indication of the industrial source having a low impact, depending on the context.

Situations where a noise impact assessment may need to be modified due to the context include those where:

- The residual sound levels in the absence of the industrial / commercial source are particularly high or low.

- The character of the residual sound has acoustic features comparable to those of the industrial / commercial sound.

- The sensitivity of the receptor is significant, and whether residential properties incorporate design measures that secure good internal or outdoor acoustic conditions.

3.0 Proposed Development

The proposed waste transfer station will occupy land off Cawood Road, Stillingfleet that was previously the site of Stillingfleet Mine as shown on MWP Planning drawing no. 10131/02. The site is 500m from a farmhouse on Kelfield Road and 750m from the next nearest dwellings. The proposed working hours are 07.00 to 19.00 on weekdays and 07.30 to 13.00 on Saturdays. There will be no working on Sundays or public holidays other than for maintenance.

3.1 Sound Sources

The proposed sound sources at the waste transfer station will consist of a Trommel screener, a jaw crusher and a shredder inside a building, a vibrating screener located outdoors, diesel-powered wheeled mobile plant to move materials within the buildings and transport materials outdoors, and road-going lorries.

Sources Inside Buildings

The proposed sound sources inside existing buildings are:

- Trommel screener inside Processing Building
- McCloskey J44 jaw crusher inside Processing Building
- Terex TDS V20 shredder
- Wheeled loaders visiting both buildings on a part-time basis.

Outdoor Sources

The proposed sound sources operating outdoors will be:

- 2-off Case 821F wheeled loaders
- Doosan 300-5 wheeled loader
- McCloskey S190 vibrating screener
- CAT XQP500 generator
- 19t and 29t lorries delivering materials to the site.

The access door to the Processing Building faces away from the direction of the nearest dwelling to the northeast. The door to the Dry Storage Building faces towards the northeast. It is assumed that access doors will be open during working hours. The site layout will incorporate stockpiles of untreated demolition waste and aggregate product that will shield all dwellings to the northwest and northeast from all sound sources. The outdoor screener will be unshielded in the south and east directions but otherwise all sound sources will be shielded in all directions by either the stockpiles or by the buildings.

3.2 Source Sound Levels

The methods of quantifying the sound levels of sources on a proposed site are described in section F.2.1 of BS 5228-1. Three alternative means of obtaining the necessary data on source sound levels are described:

(a) Carry out sound measurements on similar plant items operating in the same mode as those proposed at the application site.

(b) Use data on typical sound levels of various plant items as provided in Annexes C and D of BS 5288-1.

(c) Use data on the maximum permitted sound levels of plant items under EC Directive 2000/14/EC[11].

Section F.2.1 advises that "The method given in item (a) is likely to provide the most accurate prediction". Manufacturers' test data is available on five of the plant items and so method (a) has been used for these sound sources. At the time of our survey there was no equipment at the site and so method (b) is used on the other plant items. Tables C.2, C.9 & C.11 (respectively) of BS 5228 give data on typical sound levels to be used for predictive purposes for loaders, crushers and lorries on an access road as overall dB LA_{eq} values and as octave band sound frequency spectra.

The sound generated by sources and used in the predictions of this report are shown below, expressed as sound pressure levels at 10m distance:

Sound Source	**Data**	**Sound Level at 10m dB LA_{eq}**
Anaconda TD516 Trommel Screener	manufacturer	79
Case 821F loaders 153 kW	BS 5228	76
Doosan 300-5 loader 202 kW	BS 5228	79
McCloskey J44 jaw crusher 205 kW	BS 5228	96
McCloskey S190 vibrating screener	manufacturer	81
Terex TDS V20 shredder	manufacturer	84
CAT XQP500 generator, 50% rating	manufacturer	62
CAT XQP500 generator 100% rating	manufacturer	67
Lorries on access road 19t	BS 5228	83
Lorries on access road 29t	BS 5228	83

4.0 Sound Levels at Receptors

4.1 Receptor Locations

The nearest noise-sensitive receptors to the development are:

(a) Mount Pleasant Farm on Kelfield Road at 500m to the northwest,
(b) farm off Cawood Road at 750m to the northeast,
(c) farm on Moor Lane at 1000m to the south,
(d) farm off A19 road at 1250m to east.

The land profiles between the development and the receptors are relatively flat with no significant undulations to provide natural shielding. Stockpiles of untreated material and aggregate product will be positioned along the northwest and northeast boundaries of the site as shown on MWP drawing no. 10131/02 to shield the vibrating screener and shredder. Shielding attenuation of 10 dBA is asssumed from these two sources towards the northwest and northeast.

4.2 Predicted Sound Levels

Calculations of the sound levels from site-based plant items and road-going vehicles as affecting the nearest receptors are given in Appendix 1 to this report. The predictions are summarised in the table below. All values are dB LA_{eq}(1-hour).

Receptor Position	Buildings	Outdoor Plant	Lorries	All Sources
(a) Farm on Kelfield Road	21	33	40	41
(b) Farm off Cawood Road	26	28	33	35
(c) Farm on Moor Lane	13	35	25	35
(d) Farm off A19	21	32	28	34

The above table shows that the main sound source affecting the nearest dwellings (a) and (b) will be lorries on the access road. The main source affecting the more distant dwellings will be the outdoor plant items.

4.3 **Background Sound Levels**

Background sound levels were measured as part of this survey at the nearest receptors during the daytime of Tuesday 6th September and Friday 23rd September 2016. The receptor positions are shown on the attached site plan. Four measurements each of duration 15 minutes were taken at each position

Daytime background dB LA_{90} results:

Dwelling Position	**Kelfield Road Pos.(a)**	**Cawood Road Pos,(b)**	**Moor Lane Pos.(c)**	**Off A19 Pos.(d)**
Day/Time	10.00-11.00	11.30-12.30	13.00-14.00	14.30-15.30
06.09.16	40.8	39.9	41.1	38.2
06.09.16	39.1	39.8	41.9	37.9
06.09.16	40.3	40.8	43.2	37.8
06.09.16	40.1	40.6	43.3	38.9
23.09.16	38.4	40.8	39.2	36.2
23.09.16	37.2	41.4	38.4	36.5
23.09.16	37.5	41.9	39.5	36.4
23.09.16	38.7	40.2	38.7	37.9

Average of above daytime background levels dB LA_{90}(15-min)

	06.09.16	23.09.16
(a) Kelfield Road	40.1	38.0
(b) Cawood Road	40.3	41.1
(c) Moor Lane	42.4	39.0
(d) Off A19	38.2	36.8

Climatic conditions during the survey on 6th September were dry with a temperature of 18-20°C, wind speed of 3-4 m/s and 60% cloud cover. Conditions on 23rd September were dry with a temperature of 16-18°C, wind speed of 4-5 m/s and 40% cloud cover.

5.0 Impact Assessment

5.1 Noise Rating Levels

The table of 4.2 predicts that lorries on the access road and outdoor plant items will form the main components of sound emitted from the development. The character of sound from these sources is not expected to be tonal or impulsive but it will vary intermittently and is expected to be readily distinctive against the residual acoustic environment. BS 4142: 2014 adds a 3 dB penalty to the source sound levels under these circumstances. The sound rating levels are 3 dB greater than the predicted values listed in 4.2.

5.2 Comparison With Background

The rating levels are compared with the background sound levels described in 4.3.

Receptor	Rating Level dBA	Background Level LA_{90}	Comparison v. Background
(a) Kelfield Road	44 dBA	38-40 dBA	4-6 dB above
(b) Cawood Road	38 dBA	40-41 dBA	2-3 dB below
(c) Moor Lane	38 dBA	39-42 dBA	1-4 dB below
(d) off A19	37 dBA	37-38 dBA	0-1 dB below

5.3 BS 4142 Assessment

The method of BS 4142 rates the sound predicted from the development as:

- "adverse impact" but less than "significant adverse impact" at the nearest dwelling on Kelfield Road,
- "low impact" at all other dwellings.

The dominant source affecting the dwelling on Kelfield Road will be lorries on the access road, as shown in the table of 4.2. The access road passes at 230m from the dwelling. There is already HGV traffic on the

access road and there is believed to have been greater HGV usage of this road when it provided access to Stillingfleet Mine. By the method of BS 4142: 2014 this should be taken into account and the impact assessment may be modified in terms of the “context” of the sound sources but the BS 4142 method does not quantify any correction values for “context”.

6.0 National Planning Policy Framework

The NPPF and its related Noise Policy Statement for England (NPSE) do not quantify any values against which to make an assessment. In this respect the BS 4142 conclusions are useful but it must be borne in mind that the BS 4142 rating includes a correction penalty (+3 dB in this case) and that the actual sound levels from the development are thereby 3 dBA lower than those used in the BS 4142 comparisons.

The conclusion of this survey is that at one dwelling the predicted sound level from the development will exceed the measured background levels by 2-4 dBA and that at all other dwellings the sound from the development will not exceed the background.

In terms of the guidelines of the NPPF summarised in 2.1 of this report it is predicted that:

- sound from the development will reach the Lowest Observable Adverse Effect Level (LOAEL) at one dwelling, Kelfield Road,

- sound from the development will achieve No Observed Effect Level (NOEL) at all other dwellings.

APPENDIX 1

SOUND LEVEL CALCULATIONS

A. **Sources In Buildings**

The process building will house the Trommell screener and the jaw crusher. Wheeled loaders will operate inside both buildings. The sound levels of sources inside the buildings are:

Sound Source	Data	Sound Level at 10m dB LA_{eq}
McCloskey J44 jaw crusher 205 kW	BS 5228	96
Anaconda TD516 Trommel Screener	manufacturer	79
Terex TDS V20 shredder	manufacturer	84
Case 821F loaders 153 kW	BS 5228	76
Doosan 300-5 loader 202 kW	BS 5228	79

Process Building

It is assumed for the purpose of sound predictions that during the assessment period of one hour the jaw crusher and the Trommell screener and shredder will operate with 100% utilisation and one loader will operate with 50% utilisation inside the process building. The combined sound level from these three sources would be the logarithmic addition of 96+79+84+76 = 96.4 dB LA_{eq}. Since the sound level data is based on outdoor measurements the interior sound level inside the building will be enhanced by interior sound reflections, estimated to add 5 dBA, such that the sound level inside the process building is estimated at 101.4 dB LA_{eq}.

Dry Storage Building

It is assumed for predictive purposes that one loader may operate with 50% utilisation inside the dry storage building. Using the same calculation steps as above the sound level inside the dry storage building is estimated at 81 dB LA_{eq}.

Outdoor Sound Levels
The outer fabric of the buildings is estimated to provide an indoor-to-outdoor sound level difference of 30 dBA, reducing to 10 dBA in the direction through open access doors. The outdoor sound levels at 1m from the process building are estimated at 71 dB LA_{eq} increasing to 91 dB LA_{eq} at the elevation with open doors and the outdoor sound levels at 1m from the dry storage building are estimated at 51 dB LA_{eq} increasing to 71 dB LA_{eq} at the elevation with open doors

The buildings will form 'line' sources of sound in their near vicinity in which the sound decay from the outer surface of the buildings to 10m distance is given by the formula:

line source sound decay to 10m = 10 log (distance) dB = 10 dBA

The outdoor sound levels at 10m from the building elevations, caused by sources inside the buildings are predicted at:

Building	**Direction**	**Sound Level at 10m dB LA_{eq}**
Process	all except northeast	61
	northeast	81
Dry Storage	all except northwest	41
	northwest	61

Distance Decay
Arable land separates all of the dwellings from the waste transfer station. This will provide sound attenuation caused by the absorptive effect of a 'soft' (ie. undeveloped) ground surface, in addition to normal dispersive sound decay. This effect has been quantified in BS 5228 as providing overall sound decay over the outdoor distances for which point sources of sound apply in accordance with:

sound decay = 25 log (distance/10) - 2 dB

applicable to sound decay from sources measured at 10m distance.

Sound Shielding
The stockpiles of untreated waste and aggregate product will provide 10 dBA shielding attenuation towards the northeast and northwest.

Predictions at Dwellings

After subtracting the distance decay and shielding attenuations the sound levels at the dwellings from sources inside the buildings are as predicted overleaf. The values are all dB LA_{eq}(1-hour).

Dwelling Location	Process	Dry Storage	Both Buildings
Kelfield Road 500m NW	21	11	**21**
Stillingfleet village 750m NW	16	16	**19**
Cawood Road 750m NE	26	0	**26**
Moor Lane 1000m S	13	0	**13**
off A19 1250m E	21	0	**21**

B. **Outdoor Plant Items**

In the assessment period of one hour it is assumed that three loaders may each operate outdoors with 50% utilisation and the outdoor fixed plant items may all operate at 100%. The sound levels at 10m distance from the outdoor sources are described in 3.2 of this report as:

Sound Source	Data	Sound Level at 10m dB LA_{eq}
Case 821F loaders 153 kW (2 off)	BS 5228	76
Doosan 300-5 loader 202 kW	BS 5228	79
McCloskey S190 vibrating screener	manufacturer	81
CAT XQP500 generator, 50% rating	manufacturer	62
CAT XQP500 generator 100% rating	manufacturer	67

The combined sound level at the equivalent distance of 10m from all outdoor plant operating together is 83 dB LA_{eq}(1-hour). All sources will have shielding attenuation of 10 dBA in the direction of Kelfield Road, Stiilingfleet village and Cawood Road. After subtracting the sound decay over the outdoor distances to dwellings using the formula described in (A) above the predicted sound levels at the dwellings caused by outdoor sources are (dB LA_{eq}(1-hour):

Dwelling Location	All Outdoor Plant Items
Kelfield Road 500m NW	**33**
Stillingfleet village 750m NW	**28**
Cawood Road 750m NE	**28**
Moor Lane 1000m S	**35**
off A19 1250m E	**32**

C. **Road-Going Lorries**

The sound levels at the nearest noise-sensitive receptors caused by HGVs on the haul road are calculated using the "Method for mobile plant using a regular well-defined route (eg. haul roads)" given in section F.2.5 of BS 5228. Base data is obtained from Table C.11 of BS 5228 Refs. 6 & 20 that gives the sound level of 29t and 18t lorries on access roads as being 83 dB LA_{eq} at 10m distance as a value to be used for predictions. The calculation procedure described in F.2.5.2 of BS 5228 is used.

(a) Stage 1. The haul road formula for single-engined mobile plant items:

$$LA_{eq} = L_{WA} - 33 + 10 \log Q - 10 \log V - 10 \log d \text{ dB}$$

where: L_{WA} is the sound power level of the plant item
Q is the number of vehicle passages per hour
V is the average vehicle speed in km per hour
d is the distance of the receptor from the haul road

It is assumed that the given value of 83 dB LA_{eq} at 10m for the lorry sound level allows for free-field sound radiation over a reflective plane, such as the existing haul road and hardstanding of this site, and thereby corresponds to a sound power level L_{WA} of 111 dBA.

The number of lorry passages per hour Q is taken as 12 inclusive of inwards and outwards.

The average HGV speed along the haul road V is assumed to be 40 km per hour (25 mph).

The distances d from receptors to the centre of the haul road are shown in the table overleaf.

(b) Stage 2. It is assumed that there is no screening attenuation.

(c) Stage 3. The angles of view from receptors to the haul road are shown in the table overleaf together with the corrections to be added to the values given in (a) Stage 1. The formula:

angle of view correction A = 10 log (angle/180) dB

gives a negative value such that in every case the correction is effectively subtracted.

(d) Stage 4. The only road-going vehicles considered are lorries.

(e) Stage 5. There are predicted to be 6 HGVs per hour travelling at an average speed of 32 km/hour (20 mph) in and out along the haul road, the maximum length of which is approximately 750m. The average time of passage along the haul road will be 1.4 minutes per vehicle in each direction. In any assessment period of one hour there will be a lorry on the haul road for 17 minutes. The sound from lorries will apply for 28% of the assessment period.

After taking account of the above distances, angle of view corrections and utilisation the predicted sound levels at the receptors caused by lorries are predicted at the values shown below. The values are dB LA_{eq} (1-hour) corrected to the nearest whole decibel.

Receptor		**Basic LA_{eq} (Stage 1)**	**Angle of View Correction**	**Utilisation**	**Lorry Sound**
Kelfield Road	280m	48.2	(100^{o}) -2.6	(28%) -5.5	**40**
Stillingfleet	460m	46.1	(100^{o}) -2.6	(28%) -5.5	**38**
Cawood Road	680m	44.4	(45^{o}) -6.0	(28%) -5.5	**33**
Moor Lane	1300m	41.6	(15^{o}) -10.8	(28%) -5.5	**25**
off A19	1250m	41.7	(30^{o}) -7.8	(28%) -5.5	**28**

APPENDIX 2

A. **Qualifications and Equipment**

It is a requirement of BS 4142: 2014 that the qualifications and professional memberships of any consultant involved in the survey are listed in the report.

S & D Garritt Ltd are members of the Association of Noise Consultants (ANC). All work related to this report was undertaken by Elizabeth Garritt, Stephen Garritt and David Garritt.

Elizabeth Garritt is an Associate Member of the Institute of Acoustics and holds an honours degree in Biomedical Science. Stephen Garritt has been a member of the Institute of Acoustics (MIOA) since 1977 and holds an honours degree in Electrical Engineering. David Garritt has been a member of the Institute of Acoustics since 2005 and holds an honours degree in Electronic and Computer Systems Engineering. Both Stephen and David Garritt teach acoustics at post graduate level on a part time basis.

Stephen and David have extensive experience in the preparation of noise surveys to the appropriate version of BS 4142 for proposed industrial developments directly comparable to the subject of this report.

The equipment used during the site visits is shown in the table below. The sound level meter was calibrated before and after use; no drift was apparent.

Equipment Description	Type number	Manufacturer	Date of expiration of Calibration	Calibration Certificate Number
Sound Level Meter	2260 s/n 2409281	Bruel & Kjaer	29.09.17	CDK1307592
Microphone	4189 s/n 2395266	Bruel & Kjaer	29.09.17	CDK1307592
Calibrator	4231 s/n 2402706	Bruel & Kjaer	05.08.17	CDK140573

B. **Uncertainty**

It is a requirement of BS 4142: 2014 that the level of uncertainty in data and calculations should be considered. These uncertainties and how they have been minimised are considered in this section.

The sound sources for which measurements have been taken were tested by their manufacturers and published results have been used. Sound data on other sources has been taken from standard data given for predictive purposes in BS 5228.

Background measurements were taken on two separate occasions at four representative positions. Four measurements of fifteen minutes each were taken at each position during each of the background survey periods. Environmental conditions were suitable in accordance with the requirements of BS 4142: 2014.

The procedures used for the calculation of specific sound level at the dwellings are based on basic, fundamental principles of acoustics. Sound decay with distance from the source has been calculated using principles of plane source, line source and point source decay proposed by Rathe. The addition and subtraction of sound levels was done logarithmically on an energy basis, which is the correct method for decibel calculations. It is anticipated that this method would be considered by other suitably qualified acousticians to be relevant, correct and appropriate for this survey and is a method examined by the Institute of Acoustics on their post graduate diploma course.

All sound level measurements were taken with a calibrated type 1 sound level meter, which represents the most accurate type of SLM available. Sound levels were measured to the nearest 0.1 dB, time periods were measured and recorded to the nearest second. No rounding was done in any calculations, the only rounding being done on final results, in compliance with BS 4142 : 2014. The sound level meter was calibrated before and after each survey period and no drift was apparent.

It is concluded that the uncertainty in this survey has been minimised as far as possible and is believed to be below the level at which it would have an impact on the assessment conclusions contained in this report.
